ORDER

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

6180.4

2/22/83

SUBJ: National Airspace Data Interchange Network (NADIN) Cutover

1. PURPOSE. This Order provides details describing the NADIN cutover process. It is to be used by all facilities to be affected by the NADIN implementation. Detailed implementation procedures to be adhered to will be issued by a joint Program Engineering and Maintenance Service (APM) and Air Traffic Service (AAT) signature correspondence and will be organized on a site-by-site basis. These procedures will reference this order as authority.

2. DISTRIBUTION. This directive is distributed to the staff level for the Associate Administrator for Development and Logistics; to branch level in the Program Engineering and Maintenance and Air Traffic Services in Washington headquarters; to branch level in regional Airway Facilities and Air Traffic divisions; and limited distribution to all Airway Facilities and Air Traffic field offices. Copies are also distributed to the Management Systems Division, AAC-60; the FAA Depot, AAC-400; the Airway Facilities Branch, AAC-940; and the Requirements Branch, ACT-720. This directive is of interest to all offices and facilities to be associated with any aspect of the NADIN cutover process. Distribution outside the Federal Aviation Administration will be made by the NADIN program office to the Air Transport Association (ATA), Aeronautical Radio Incorporated (ARINC), Department of Defense (DOD), the National Weather Service (NWS), and the International Air Transport Association (IATA).

3. BACKGROUND

a. Network equipment.

(1) All of the NADIN equipment is being supplied by the North American Philips Corporation (NAP). The system consists of two switching centers: one located at Atlanta, Georgia, and the other at Salt Lake City, Utah. The switching centers will use Philips DS-714/81 Mark 3 Processors, and they will be interconnected with 9600 bps full duplex lines. Each switching center is capable of running the entire network should the other center fail.

(2) Each ARTCC will be supplied a Philips concentrator and will be connected to its appropriate switching center via a 9600 bps full duplex line. Backup service for the data line is provided via an automatic dial-up capability using the direct distance dial (DDD) telephone network. NADIN dial-up circuitry is to be ordered with load control arrangements to ensure dial tone for DDD access during heavy traffic or emergency conditions.

Distribution: A-W(PM/AT)-3; A-X(AF/AT)-3; A-W(DL)-3;AAC-400(1 cy) Initiated By: APM-500
A-FAF/FAT-0(Ltd); AAC-60(1 cy); AAC-940(1 cy)
ACT-720(2 cys)

b. FAA Technical Center and FAA Academy Equipment. The concentrator for the FAA Technical Center is to be the first unit installed and will be used for software development for the 9020. The FAA Academy concentrators will be installed shortly thereafter by local personnel to support the technical training effort. Both of these facilities will operate with the switching centers via dial-up line facilities once NADIN is operational.

c. Network Procedures. All stations currently on Aeronautical Fixed Telecommunications Network (AFTN), Automated Service B Data Interchange System (A-BDIS), and utility B circuits will have some procedural changes when NADIN is commissioned. For those FSS locations using 100 wpm Model 28 equipment, the changes will be quite small. It will no longer be required to use an origin line, nor will the date time group be required as NADIN will provide these items for the message. The originating station will receive an automatic response message containing this information upon acceptance by the network of the message. All traffic from NADIN will be in International Civil Aviation Organization (ICAO) format. The current all-circuit calls will disappear in NADIN and will be replaced with a new group address structure. All other FAA terminals will use the NADIN format which is based on the IA-5 code set. Existing military Base Operations (BASOPs) will use the ICAO message envelope format for both input and output. All of the procedural changes will be documented in detail to the latest edition of Order 7110.80, Data Communications, by the Air Traffic Service.

d. External Interfaces. The NADIN will interface with many non-FAA users, and any terminal on NADIN may communicate with any other terminal on the network. The interconnects are as follows:

(1) National Weather Service (NWS). The NWS computer at Suitland (KWBC) will be connected to NADIN with a medium-speed line which may also be shared with a keyboard video display unit (KVDU) message terminal.

(2) Weather Message Switching Center (WMSC). The WMSC at Kansas City will be interconnected to both switching centers. Data between the WMSC and the ARTCCs (9020s and Direct Access Radar Channel [DARC] equipment) will be handled via this interface as well.

(3) Airlines. NADIN will have medium-speed and low-speed interfaces with ARINC and Eastern Airlines for handling flight plans, position reports, NOTAMs and flow control information.

(4) Canadian AFTN Switch. NADIN will interface the Canadian AFTN switch with a medium-speed line using a high level protocol. This interface will be used for all aeronautical data exchanges between Canada and the United States.

(5) Air Force. NADIN will interface with the Air Force switching center at Carswell Air Force Base via a medium-speed circuit. Classified traffic is not supported by NADIN.

(6) International AFTN Circuits. All international circuits currently in the United States operated portion of the AFTN will be interfaced to NADIN. As other countries upgrade their switching centers, and as traffic volume warrants, NADIN will upgrade the interconnecting circuits to medium-speed with improved link

control procedures. All international interconnecting circuits are reliable underseas cable or satelite circuits. There will be no HF circuits connected to NADIN.

(7) Panama AFTN Switch. The Panama AFTN switch should be fully operational by the time NADIN is implemented. If this is the case, it will be interfaced to the NADIN system via a circuit through a concentrator. The Kansas City/Panama multiplex system will be decommissioned when the Panama AFTN switch is fully operational.

(8) Consolidated NOTAM System (CNS). NADIN will interface the CNS with a medium-speed line using Category B protocol.

4. CUTOVER PLAN.

a. General.

(1) Prior to starting the cutover process, an extensive period of testing NADIN hardware and software will be conducted. This testing will include the NADIN backbone circuits that interconnect all NADIN nodes and interfaces to the AFTN switching center and the WMSC located in Kansas City, local interfaces at the ARTCCs, and fallback/recovery modes of operation. During the later part of this testing, live traffic will be injected into the network by connecting selected low-speed circuits at the concentrator locations. This activity will test out the final routing table configuration and message flow to the NAS 9020 and System 7 (or equivalent) computers. Detailed cutover procedures will include facilities, dates, times and activities necessary to effect cutover in a timely and facility-dependent manner. The procedures will take into consideration such things as manpower availability (FAA and common carriers), charting dates for the 9020s and update schedules of other computers that will interface with NADIN. For these reasons, the agreed final cutover schedule must be adhered to in all cases to provide continuity of services during the transition period. Initial Operating Capability (IOC) will commence with the activation of the first circuit handling live traffic. NADIN commissioning will immediately follow an Operation Readiness Demonstration (ORD). The ORD will be held as soon as possible after the last NADIN circuit is brought into the network. After NADIN is implemented, the computers at the National Communications Center (NATCOM) that provide message switching services for AFTN, Area B, and National Airspace Network (NASNET) will be placed in a standby state for eventual decommissioning no sooner than 120 days after the last 9020 interface has been established.

(2) A complete description of the NADIN System and the cutover concept (Appendices Q and M of the NADIN specification respectively) was provided to each regional and center office. Reprints for field distribution should be requested through normal channels. A general outline of the cutover sequence is provided in Appendix 1.

b. Management. Complete cooperation will be required by all to ensure an orderly imnplementation of NADIN with minimum disruption to the users. In order to accomplish this task, a cutover committee has been named and is responsible for developing the plans and scheduling of events. This cutover committee will consist of representatives from the Air Traffic Service, the Program Engineering and Maintenance Service, and NADIN contractor(s). A cutover director has been

named from within the NADIN program who has the responsibility and authority to direct and coordinate agency resources needed to accomplish the cutover. Cutover teams will be established at NATCOM, and at each switching center to assist the Cutover Director. These teams will consist of personnel from APM and AAT, and at the switching centers will include NADIN contractor personnel. These teams will actually accomplish the cutover process. At each concentrator location, one APM person should be designated to handle cutover activities at that site with support from other APM and AAT personnel. The starting and ending of the cutover phases and all related information will be distributed via Service B messages by the Cutover Director. The Cutover Director is responsible for maintaining the schedule and is the only person authorized to make changes to that schedule. Any changes will be coordinated fully with the affected facilities and will be kept to an absolute minimum due to the ripple effect on other facilities and cutover activities. Facility managers should take into account the availability of personnel and other facility activities taking place during this period.

c. Cutover Concept.

(1) The intent is to cut over NADIN by service (i.e., Center B, Area B, AFTN, etc.) at the CONUS ARTCCs. The cutover at the Anchorage, Honolulu, and San Juan concentrators will be accomplished during the slack time when charting dates for the 9020s and updating schedules of other computers prohibit any cutover activity at the ARTCCs. The first services that will be cutover are Center B and NAS/WMSC. It is felt that cutting over these services first has the advantage of exercising the entire NADIN system and verifying the 9020 interfaces with live traffic. Should problems arise, the ability to fall back to the low-speed system can be easily accomplished.

(2) The second group of circuits that will be cutover are the medium-speed circuits connected directly into the ARINC and Eastern Airlines switching centers. The flow control AFTN circuit will also be interfaced with NADIN at this time.

(3) At this point if Model 1 FSS is operational, these interfaces with NADIN will be established along with the third group of circuits which consist of the low-speed Area B and the medium-speed MAPS and AWANS circuits. If Model 1 FSS is not yet operational, or only at selected sites, NADIN will interface with designated FSSs with special Area B type circuits until the Model 1 automation equipment is operational. The Utility B circuits such as Military B and Airline B will then be cut over. Finally, the AFTN and any remaining circuits will be cutover, thus completing the system.

(4) Appendices to this Order will provide detailed plans for cutting over existing services such as Service B, the AFTN, Utility B, etc., into the NADIN system.

d. Circuits and Multiplexing.

(1) All common carrier circuits (exclusive of backbone circuitry) that will be connected to the NADIN concentrator, and not now in the ARTCC, will be ordered up and in service at the ARTCC thirty days prior to cutover at that site. Since most of these are working circuits, the Telecommunications Service Requests (TSRs) should be written to show the ARTCC as an additional new drop on the

existing circuit. This will be the responsibility of the Regional Communications Validation Officer upon instruction from the Cutover Director. Planning for circuits will be made to accommodate Model 1 FSS sites on either dedicated 100 wpm circuits or 1200 bps circuits. Final plans will be based on the relative schedule of NADIN and the Flight Service Automation System (FSAS), Model 1.

(2) Shortly after cutover, the existing FAA multiplex systems in New York, Miami, and Oakland should be reconfigured to place all WMSC circuits on one multiplex system. This will permit one multiplex system at each of these locations to be decommissioned after NADIN cutover, thus saving additional leased services money. APM NATCOM has the lead on this item.

(3) When the Honolulu and San Juan concentrators are fully operational, the corresponding multiplex system will also be decommissioned when the low speed MET circuits are accommodated by other means. When the Alaskan concentrator is ready for commissioning, the AFTN interface to the leased system will be cutover.

(4) All TSRs for NADIN circuits and any required modems will be processed to Defense Commercial Communications Office (DECCO) using a combination of regional headquarters funding. Release of TSRs for action will be coordinated with the Cutover Director. AAT will be coordinated with prior to releasing any TSRs for discontinuance of full backup capabilities supported by NATCOM services.

e. Facility Impacts. All facilities now being served by FAA teletypewriter and data circuits, except Service A drops, will be impacted by the implementation of NADIN (see Figure 4-1).

(1) At FSS facilities, those FSSs that are scheduled to the receive Model 1 FSS automation equipment will either cutover to the Model 1 equipment or be taken off their existing 100 wpm multipoint Service B circuit and be put on a dedicated NADIN circuit. Which action takes place will depend on the status of the FSS automation program at the time of the NADIN cutover. Message formatting changes will also be required, and these changes will be described in appropriate orders or as changes to the latest edition of Order 7110.80.

(2) All existing military BASOPs will have changed to an ICAO message envelope format and will become full network terminals; i.e., any military BASOP can send and receive traffic to/from any other NADIN terminal.

(3) All data into and out of the ARTCC 9020 computer will be done via a general purpose input/general purpose output (GPI/GPO) interface. All current 100 wpm teletypewriter ports on the 9020 will eventually be decommissioned. The NADIN will communicate with the 9020s in Extended Binary Coded Decimal Interchange Code (EBCDIC).

(4) The ARTCC teletypewriter equipment will be replaced on a phased-in basis as the associated concentrator is brought into operation. An FAA Data Terminal Equipment (DTE) will be installed prior to cutover and will become operational when the Center B traffic is absorbed into NADIN. These DTEs are not provided by the NADIN program. This equipment will operate on a new local circuit at 1200 bps. When the concentrator is fully operational all teletypewriter equipment, including the NASNET terminal, can be removed from the facility. (The above does not include any secure communications facilities.) Any remaining in-house low-speed circuits will require battery to be provided by the FAA.

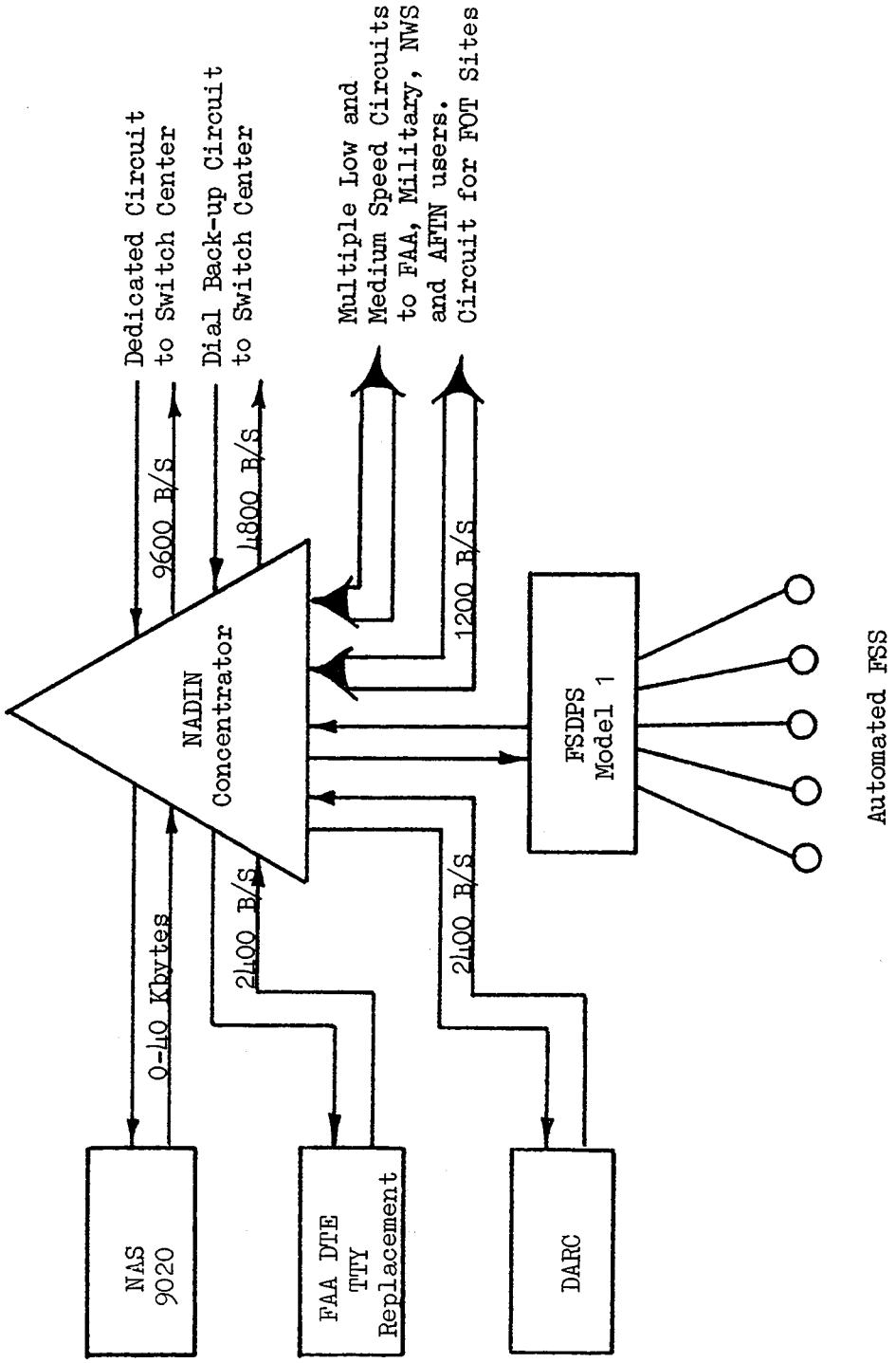

Figure 4-1. NADIN-1 Concentrator Configuration

(5) The DARC, which presently receives altimeter data from the WMSC, will be disconnected from its present low-speed circuit and placed on a new medium-speed circuit at the ARTCCs.

(6) The flow control computer in Jacksonville will be connected to the Atlanta switch via a medium-speed circuit. The exact timing of this cutover will be worked out by the Cutover Committee. Incoming flow control messages will be routed via NADIN to the five store and forward 9020 which will, via NADIN, forward the messages to the NADIN Atlanta switch where they will be delivered to the Jacksonville flow control 9020A computer via a dedicated high-speed point-to-point circuit. Manual output message traffic from the flow control facility in Jacksonville (St. Luke's) will be via the FAA DTE operating at 1200 bps. These terminals are presently in place.

(7) FAA regional message centers will receive FAA M-42/43 automatic send/receive (ASR) teletype equipment to replace teletypewriter equipment used on Area B. After this equipment is operational, the messages normally sent or received on NASNET will be handled on this terminal when NASNET is decommissioned. These terminals are not provided under the NADIN program.

(8) NASNET terminals and the switching computer at NATCOM will be decommissioned following NADIN cutover. The messages previously handled on NASNET will be handled in the following manner:

(a) ARTCC terminals by leased terminals;

(b) FAA headquarters terminals (2) by leased terminals;

(c) FAA Technical Center terminals (3) by leased terminals;

(d) Automated Radar Tracking System (ARTS-III) field support sites (10) by leased terminals on a dial-up basis.

f. Future Network Services. Detailed cutover plans for integrating new services such as Flight Data Input/Output (FDIO), Remote Maintenance Monitoring (RMM), and Model II FSS Automation will be developed when those programs indicate dates for requiring NADIN services.

5. DELEGATION. APM-1 and AAT-1 are delegated the authority to distribute the detailed NADIN Test and Cutover Plan required for field use in implementing NADIN. This authority may be redelegated to division level (APM-500 and AAT-100).

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